

WHAT IS CLAIMED IS:

1. A substrate processing apparatus comprising:

a process chamber in which a substrate is plasma-processed;

5 a gas introducing mechanism configured to introduce gas into said process chamber;

a first exhaust mechanism having a first exhaust port provided at a first position in said process chamber, and configured to exhaust the inside of said process chamber when gas for plasma processing is introduced into said process chamber by said gas  
10 introducing mechanism to plasma-process the substrate;

a second exhaust mechanism having a second exhaust port provided at a second position that is lower than the first position in said process chamber, and configured to exhaust the inside of  
15 said process chamber when gas for cleaning is introduced into said process chamber by said gas introducing mechanism to clean the inside of said process chamber.

2. A substrate processing apparatus as set forth in claim 1, further comprising

20 a holding mechanism having a surface provided in said process chamber and configured to horizontally hold the substrate on the surface,

wherein the first exhaust port is positioned higher than said surface of the holding mechanism, and

25 wherein the second exhaust port is positioned lower than said holding mechanism.

3. A substrate processing apparatus as set forth in claim 2, further comprising

a hoisting/lowering mechanism configured to move said holding mechanism upward when the substrate is plasma-processed, and move said support mechanism downward when the inside of said chamber is cleaned,

5            wherein the first exhaust port is positioned higher than said surface of the holding mechanism that has been moved up by said hoisting/lowering mechanism, and

             wherein the second exhaust port is positioned lower than said holding mechanism that has been moved down by said hoisting/lowering  
10 mechanism.

             4. A substrate processing apparatus as set forth in claim 1,

             wherein said first exhaust mechanism exhausts the inside of said process chamber concurrently with the exhaust by said second  
15 exhaust mechanism when the gas for cleaning is introduced into said process chamber by said gas introducing mechanism to clean the inside of the chamber.

             5. A substrate processing apparatus as set forth in claim 1, further comprising

20            a microwave generator configured to generate a microwave for plasma processing of the substrate,

             wherein reactive gas is used as the gas for cleaning, and

             wherein said microwave generator generates the microwave also when the inside of said process chamber is cleaned.

25            6. A substrate processing apparatus as set forth in claim 2,

             wherein said first exhaust mechanism exhausts the inside of said process chamber concurrently with the exhaust by said second

exhaust mechanism when the gas for cleaning is introduced into said process chamber by said gas introducing mechanism to clean the inside of the chamber.

7. A substrate processing apparatus as set forth in claim  
5 2, further comprising

a microwave generator configured to generate a microwave for plasma processing of the substrate,

wherein reactive gas is used as the gas for cleaning, and

wherein said microwave generator generates the microwave  
10 also when the inside of said process chamber is cleaned.

8. A substrate processing apparatus as set forth in claim  
3,

wherein said first exhaust mechanism exhausts the inside of said process chamber concurrently with the exhaust by said second  
15 exhaust mechanism when the gas for cleaning is introduced into said process chamber by said gas introducing mechanism to clean the inside of the chamber.

9. A substrate processing apparatus as set forth in claim  
3, further comprising

20 a microwave generator configured to generate a microwave for plasma processing of the substrate,

wherein reactive gas is used as the gas for cleaning, and

wherein said microwave generator generates the microwave  
also when the inside of said process chamber is cleaned.

25 10. A substrate processing apparatus as set forth in claim  
4, further comprising

a microwave generator configured to generate a microwave for plasma processing of the substrate,

wherein reactive gas is used as the gas for cleaning, and  
wherein said microwave generator generates the microwave  
also when the inside of said process chamber is cleaned.

11. A substrate processing apparatus comprising:

5 a process chamber in which a substrate is plasma-processed;  
a gas introducing mechanism configured to introduce gas for  
plasma processing and gas for cleaning into said process chamber;  
a holding mechanism having a surface provided in said process  
chamber and configured to horizontally hold the substrate on the  
10 surface;

a first exhaust mechanism having a first exhaust port  
positioned higher than said surface of the holding mechanism in said  
process chamber, and configured to exhaust the inside of said process  
chamber; and

15 a second exhaust mechanism having a second exhaust port  
positioned lower than said holding mechanism in said process chamber,  
and configured to exhaust the inside of said process chamber.

12. A substrate processing apparatus as set forth in claim  
11, further comprising

20 a hoisting/lowering mechanism configured to move said  
holding mechanism upward and downward,

wherein the first exhaust port is positioned higher than said  
surface of the holding mechanism that has been moved up by said  
hoisting/lowering mechanism, and

25 wherein the second exhaust port is positioned lower than said  
holding mechanism that has been moved down by said hoisting/lowering  
mechanism.

13. A substrate processing apparatus as set forth in claim

11,

wherein said first exhaust mechanism exhausts the inside of said process chamber concurrently with the exhaust by said second exhaust mechanism when the gas for cleaning is introduced into said process chamber by said gas introducing mechanism to clean the inside of the chamber.

14. A substrate processing apparatus as set forth in claim 11, further comprising

a microwave generator configured to generate a microwave for plasma processing of the substrate,

wherein reactive gas is used as the gas for cleaning, and wherein said microwave generator generates the microwave also when the inside of said process chamber is cleaned.

15 12, 15

wherein said first exhaust mechanism exhausts the inside of said process chamber concurrently with the exhaust by said second exhaust mechanism when the gas for cleaning is introduced into said process chamber by said gas introducing mechanism to clean the inside of the chamber.

16. A substrate processing apparatus as set forth in claim 12, further comprising

a microwave generator configured to generate a microwave for plasma processing of the substrate,

25 wherein reactive gas is used as the gas for cleaning, and wherein said microwave generator generates the microwave also when the inside of said process chamber is cleaned.

17. A substrate processing apparatus as set forth in claim

13, further comprising

a microwave generator configured to generate a microwave for  
plasma processing of the substrate,

wherein reactive gas is used as the gas for cleaning, and

5 wherein said microwave generator generates the microwave  
also when the inside of said process chamber is cleaned.

18. A substrate processing apparatus as set forth in claim  
15, further comprising

a microwave generator configured to generate a microwave for  
10 plasma processing of the substrate,

wherein reactive gas is used as the gas for cleaning, and

wherein said microwave generator generates the microwave  
also when the inside of said process chamber is cleaned.